Item 2. Saprolite Extents

The saprolite is a critical geologic unit that affects contaminant transport on the water table and in groundwater. The saprolite typically exhibits a lower hydraulic conductivity than surrounding basalts and where present beneath the water table, it likely acts as a barrier to contaminant transport, causing groundwater and contaminants to migrate around or beneath the saprolite. The point up-valley where the saprolite/basalt interface rises above water table is a critical feature in assessing the risk the Red Hill Bulk Fuel Storage Facility poses to drinking water sources.

Characterizing the lateral and vertical extent and hydrogeological properties, of the saprolite in the area of interest including North and South Halawa Valleys is difficult. Available data include a general CSM regarding valley infills and basalt weathering; geophysical (seismic) analysis conducted along several transects; and a single detailed geologic log obtained from a borehole. While the seismic data are qualitatively valuable and informative, uncertainty remains regarding the depth at which to represent the saprolite/basalt interface. Ground truthing is costly and only very localized. Lastly, review of saprolite/basalt interface depth trends relative to the axis of the North and South Halawa Valleys suggests the saprolite is likely deeper down-valley and shallower up-valley than currently represented in the interim model: as such, the role of the saprolite as a barrier may be less protective than the current conceptual model indicates (Inset Figure 2.1).

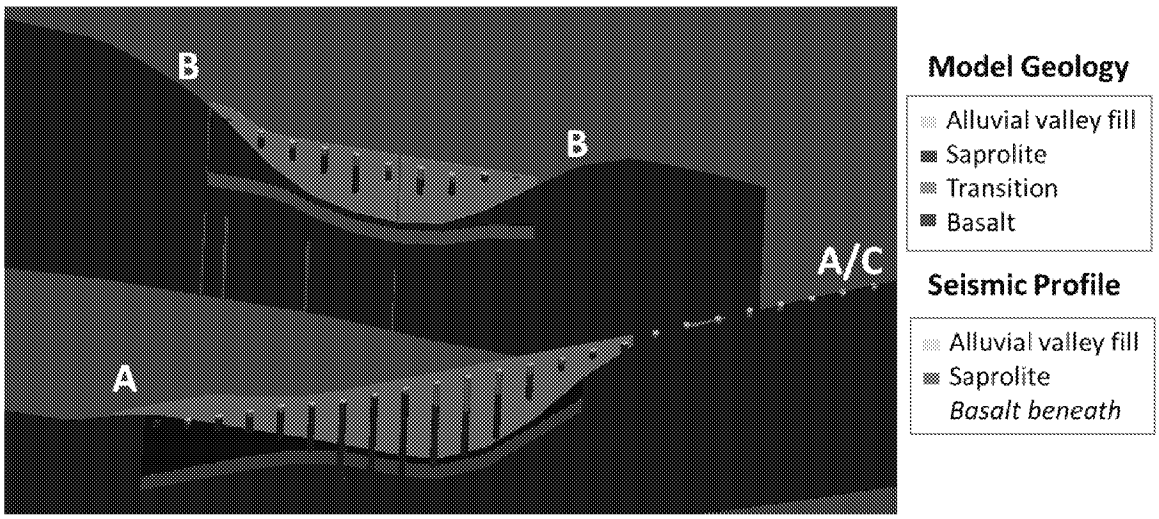

Figure 2.1 Example Comparison of Seismic Profiles and Representation in the Interim Model

There are insufficient available data regarding the depth of the saprolite/basalt interface relative to the water table, particularly in North and South Halawa Valleys, to accurately and uniquely represent them in the model or make informed decisions regarding the protection afforded to Halawa Shaft by the saprolites acting as a barrier. Available data which are large scale and of relatively low resolution (i.e., seismic profiles) must be interpreted in the context of the CSM and AOC to provide an appropriate

representation for purposes of the flow and transport modeling. Available data from borings such as the Halawa deep monitoring well (inset Figure 2.2) provide specific stratigraphic logs, but even those are accompanied by uncertainty regarding the appropriate depth to pick the interface.

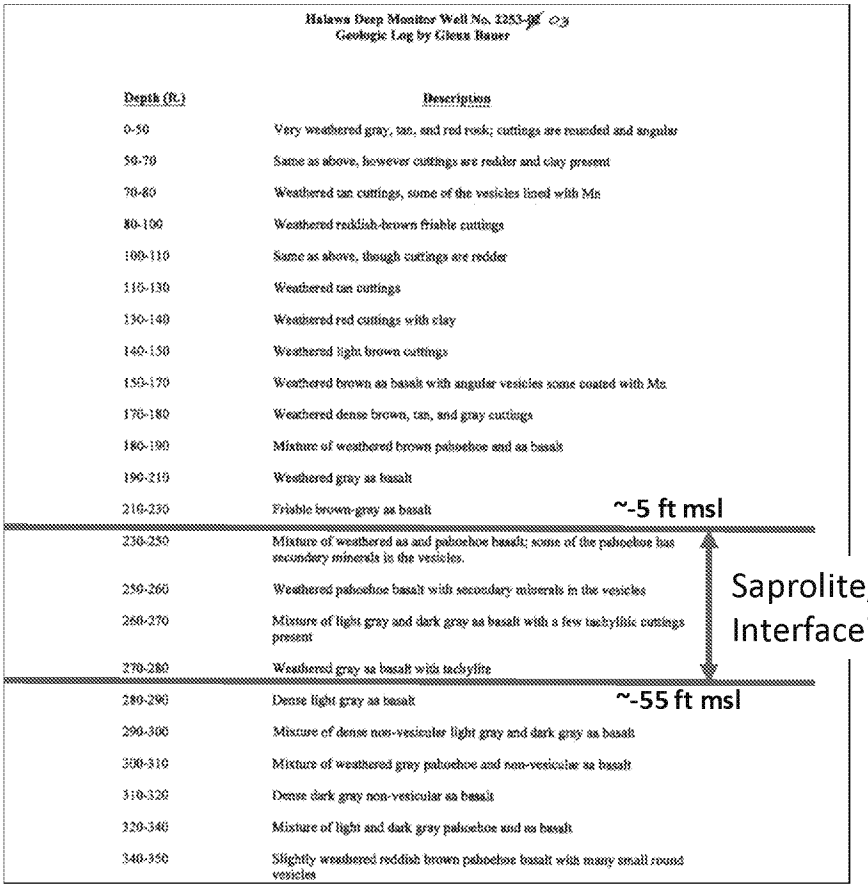

Figure [SEQ Figure * ARABIC] Stratigraphic Log from Halawa Deep Monitoring Well

The solution to this problem likely lies in two parts: First, re-interpretation of the available data. When the currently seismic-inferred depths to the saprolite/basalt interface are compared to the CSM, the down-valley transects show a deeper interface depth than the current CSM would suggest while the up-valley transects suggest a shallower interface than currently believed. Interpolating between the down-valley and up-valley transects and extrapolating this trend up-slope from the most up-valley transect may help define where the saprolite is no longer beneath the water table and thus a barrier to flow and transport. Second, ground-truthing of the seismic data using test borings (this may already be planned as there is discussion of a test boring adjacent to Seismic Transect E near the Halawa Deep Monitoring Well [HDMW2253-03]). Additional ground-truthing is highly desirable, even though costly, in targeted areas with maximal information benefit to provide (a) seismic velocities needed to better constrain the depth to the saprolite/basalt reflector and (b) interface elevations at key boring locations to condition the geophysical results.